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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial Number: 09/725,728
Filing Date: November 29, 2000
Applicant(s): Acker et al.
Title: Fuel Cell Control And Measurement Apparatus And Method, Using Dielectric Constant Measurements
Group Art Unit: Unknown
Examiner: Unknown

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Information Disclosure Statement

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Attached is a completed Form PTO-1449A and copies of the references cited thereon. Following are comments on these references pursuant to Rule 98:

US PATENT DOCUMENTS

US 4,438,182 is discussed in the background of the invention of the application as filed. US 5,414,368 appears to disclose an apparatus for measuring dielectric constants generically. These are the only two patents disclosed herein in which dielectric constants are in any way measured.

All of the remaining patents appear to disclose a variety of ways of determining the state of charge in a battery or at least determining when a battery is almost out of charge.

US 4,189,725 appears to be based on sensing oxygen levels for medical equipment in which the supply of oxygen delivered to a patient is an indirect indicator of a low battery.

A number of patents appear to primarily use voltage measurements: US 4,876,513 appears to be based on measuring battery voltages and comparing these measured voltages to discharge curves relating voltage to charge state. US 5,381,096; and 5,396,177 similarly appear to be based on battery voltage measurements.

A number of patents appear to primarily use current measurements: US 5,455,499 appears to measure battery status employing a complex algorithm utilizing current draw measurements and comparing these to known information regarding relationships between current draws and battery discharge for varying battery chemistries. US 5,563,004 appears to measure battery end-of-charge by detecting the level of current between the cathode and a hydrogen-oxygen recombination electrode. US 5,600,230 appears to estimate remaining battery capacity using current measurements and combining these measurements according to a complex algorithm with measurements of environmental conditions and battery characteristics. US 5,761,072

appears to sense battery state of charge based on current calculations. US 5,789,100 appears to disclose a battery strength indicator based on flowing a current between the battery terminals through the indicator.

US 5,592,095 appears to estimate battery charge level of a battery employed by a host device with a limited number of modes of operation, by detecting when the host device is in a particular mode of operation and activating an oscillator corresponding to that mode of operation.

US 5,606,242 appears to report various battery parameters to an external device, using a complex algorithm based upon battery voltage, current and temperature.

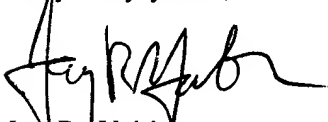
US 5,648,717 appears to measure battery charge using a current integrator, charge counter, and voltage measurement.

US 5,703,469 appears to measure battery conditions by using voltage and current measurements to determine and internal resistance and open circuit voltage for the battery.

U.S. 6,037,777 and 6,114,838 appear to determine battery properties using impedance and / or admittance measurements.

None of these patents anticipates or renders obvious, applicant's disclosure and claims regarding fuel cell control and measurement using dielectric constant measurements.

Very truly yours,

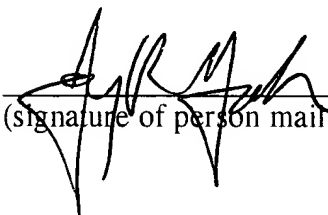


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Date of Mailing: 2-20-01 I hereby certify that this correspondence is being deposited with the United States Postal Service on the aforementioned date of mailing pursuant to 37 CFR 1.8 with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231

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